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## A Comparative Study of the Speech Development of Japanese and American Children (Part seven)

—Formation of Symbolic Function in Language Development\*—

Sei NAKAZIMA

### SUMMARY

We recorded the speech sounds of nine Japanese and four American infants in Japan and two American infants in the U.S.A., all of whom were under two years of age. We then compared the formation process of symbolic function in language development up to the beginning of the syntacticization process of the three groups.

From the first month after birth the infant cries when he is uncomfortable. His mother removes the cause of his discomfort and makes him comfortable. Through these experiences he begins to live in a state of undifferentiated unity with his mother. At about eight months of age his mother becomes his love object, his significant person, and he distinguishes her from unfamiliar persons. He recognizes his mother by the combination of her speech sounds and contour of her body, which has become the affective symbol of his mother for the infant. We would like to say that emotional symbolism is formed.

From about two months on the infant differentiates and coordinates his sensory-motor schemata and develops his cognition of the world. By the middle of the second year, the signifier has been differentiated from the signified in his sensory-motor intelligence. We would like to say that symbolic function in sensory-motor intelligence is formed.

Then, from about the middle of the second year, he begins to develop his phonemicization-symbolization process and to use words as signifiers which represent objects or situations. These objects or situations are signifieds.

As for the process described above, we do not find significant differences between the three groups.

### I. INTRODUCTION

In former articles (Nakazima, S., 1962, 1966, 1970, 1972, 1973, 1974, 1975) we described as follows: At about one month of age the infant begins to utter calm sounds, then he develops his babbling phonatory-articulatory-auditory mechanisms. From about nine months through seventeen or eighteen months

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he reorganizes his babbling phonatory-articulatory-auditory mechanisms at the level of language. Then from the middle of the second year he begins to develop his phonemicization-symbolization process.

In this article we are going to describe how the infant forms symbolic function in his language development, i.e. how he begins to understand the symbolic meaning of words and to use them himself, and what kind of factors have influence upon it.

## II. PROCEDURES

There were fifteen subjects, nine of whom were Japanese and six were Americans. As shown in Table 1, there were four female and five male Japanese

Table 1. Subjects and recording conditions.

Nationality	Place where S's sounds were recorded	Subjects (Sex)	Beginning of recording by tape recorder	One recording per
Japanese	Kyoto, Japan	E. T. (f)	28 days (0: 0, 28)	1 wk.
		Ya. N. (f)	1 mo. (0: 1)	2 wks.
		Y. S. (f)	2 mos. (0: 2)	2 wks.
		N. O. (f)	6 mos. (0: 6)	2 wks.
		H. K. (m)	1 mo. (0: 1)	2 wks.
		T. Y. (m)	1 mo. (0: 1)	2 wks.
		T. T. (m)	7 mos. (0: 7)	2 wks.
		T. U. (m)	12 mos. (1: 0)	2 wks.
		Yu. N. (m)	13 mos. (1: 1)	2 wks.
American	Kyoto, Japan	G. M. (f)	3 mos. (0: 3)	2 wks.
		F. P. (f)	6 mos. (0: 6)	2 wks.
		C. W. (m)	6 mos. (0: 6)	2 wks.
		E. D. (m)	7 mos. (0: 7)	2 wks.
American	Urbana and Champaign, Illinois, U.S.A.	M. O. (f)	15 mos. (1: 3)	2 wks.
		C. C. (m)	6 mos. (0: 6)	2 wks.

and two female and two male Americans who were living in Kyoto, and two Americans living in the U.S.A., one female and one male. We recorded on tape the speech sounds of each subject and those of his parents in the home and described the situations in which the child spoke and behaved. Each recording took about half an hour. We used two kinds of tape recorders: TEAC (TD 102, AR 11) for the subjects in Japan, and SONY EM-1 for the subjects in the U.S.A. The overall recording and reproducing characteristic of the former was from 40 Hz to 15000 Hz  $\pm 3$  dB, that of the latter from 100 Hz to 7000 Hz  $\pm 5$  dB, speed 7 1/2 inch/second. We analyzed these speech sounds on a soundspectrograph.

### III. RESULTS AND DISCUSSION

We would like to describe what we found in our study as follows. Refer to Table 2.

#### 1. Formation of emotional symbolism.

From birth to about one month, the infants produced only crying sounds. When they were uncomfortable, i.e. hungry or/and with wet diapers, they cried. When they cried, their mothers came to them and removed the causes of their discomfort, i.e. gave them milk or/and changed their diapers, and made them comfortable. Through these experiences the infants began to live in a state of undifferentiated unity with their mothers.

Many of those doing research on personality development and its disorders have emphasized the importance of this kind of undifferentiated unity of a baby with its mother. Being satisfied with its "Security needs" (Maslow, A. H., 1970) by its mother's "Loving care" (Mowrer, O. H., 1950), it lives in a state of "Basic trust" (Erikson, E. H., 1963).

According to Michiko Takahashi (1973) babies of three-month-old smiled not only at an ordinal face but also at scrambled facial models. She also reported (1974) that for babies of five-month-old the most effective stimulus to elicit smiles was a familiar person's smiling and calling the babies' names.

Spitz, R. A. (1965) laid stress on the establishment of the libidinal object in the development of the mother-child relationship. He stated: The smiling response of the baby in the third month of life did not indicate that a true object relationship was formed; If a stranger, instead of its mother, approached an eight-month-old baby, the baby showed varying degree of anxiety, and this eight-month anxiety reflected the fact that its mother was its libidinal object, its love object.

By the time the infants were about eight-month-old, they recognized their mothers by the combination of their mothers' speech sounds and contours of their bodies, which became the affective symbol of their mothers for the infants. We think that emotional symbolism is formed at about eight months of age, and that the emotional symbolism will become one of the basic roots of symbolism in linguistic function.

Based on this kind of emotional relationship with their mothers, as we stated in former articles, at about nine months they began to develop the ability to call their parents and to respond to them with sounds; at about ten months they began to be able to imitate and understand parents' speech sounds; and at about twelve months they began to pick up some of parents' words and to use them.

We also think that this kind of emotional mother-infant relationship gives him vitality in phonatory-articulatory-auditory activities and in approaching to objects which surround him, as follows.

Table 2. Formation of symbolic function in language development.

Age Year: Month	Development of speech (Nakazima, S.)	Development of mother- infant relationship (Spitz, R. A., Takahashi, M.)	Development of sensory- motor intelligence (Piaget, J.)
0: 0	1. The infant cries when he is uncomfortable.	His mother removes the cause of his discomfort and makes him comfortable. He begins to live in a state of undifferentiated unity with his mother.	1. The exercise of reflex.
0: 1	2. Development of phonatory-articulatory-auditory mechanisms at the level of babbling.	Based on Erikson's so called "Basic trust", he utters sounds and approaches objects of the world actively.	2. The first acquired adaptations and the primary circular reactions.
0: 2	1) He begins to utter calm sounds when he is comfortable.		
0: 2	2) He changes his phonatory-articulatory forms of these sounds.		
0: 3		His smiling response in the third month of life does not indicate a true object relationship (Spitz). The total smiling time to facial models is the longest at three months of age (Takahashi).	
0: 4			
0: 5		The familiar person's smiling and calling his name is the most effective stimulus to elicit smiles.	3. The secondary circular reactions and the procedures destined to make interesting sights last. The means begins to be differentiated from the end.
0: 6	3) Repetitive babbling.		
0: 7			
0: 8		The establishment of the libidinal object and the eight-month-anxiety (Spitz).	4. The coordination of the secondary circular reactions schemata and their application to new situations.
0: 9	3. Reorganization of babbling phonatory-articulatory-auditory mechanisms at the level of language.	Formation of emotional symbolism: His mother becomes his love object, and he recognizes his mother by the combination of her speech sounds and contour of her body, which is an affective symbol of his mother.	Objects of the world become objectified and begin to be permanent ones.
0: 9	1) Development of response and calling to familiar persons in simple sounds.		
0:10	2) Development of imitation and cognition of his parents' speech sounds.		
0:11	3) He begins to pick up some of his parents' words and to use them. But he does not use them as language. In all sorts of situations he utters word sounds and meaningless sounds with various articulatory forms.		
1: 0	Through these efforts of expression in sounds he begins to notice some kind of symbolic relationship between words and the world and to use words in reference to what he wants to express.		5. The tertiary circular reactions and the discovery of new means through active experimentation.
1: 1			
1: 2			
1: 3			
1: 4			
1: 5	4. Development of phonemicization-symbolization process.		Formation of symbolic function in sensory-motor intelligence: The signifier is differentiated from the signified which is referred to by the former, e.g. symbolic play and deferred imitation.
	Formation of linguistic function: words (signifiers)		Formation of symbolic function: objects or situations of the world (signifieds)
	Affective relationship with familiar persons underlies his verbal communication with them.		
1: 6			6. Invention of new means through mental combination.
1: 7			
1: 8	Further development of linguistic function, i.e. development of interrelation between phonemicization-symbolization process and syntacticization process.		

## 2. Formation of symbolic function in sensory-motor intelligence.

Through experiences dealing with objects of the outer world the infants differentiated their sensory-motor schemata and developed their cognition of the outer world.

Piaget, J. (1936) reported the following observation. When his son, at four months of age, tried to grasp the doll hanging in front of him he happened to strike the doll and made it swing, and he repeated the action a number of times. Later when he was in the same situation again he began to hit the doll. Piaget mentioned that the means began to be differentiated from the end.

Akiko Uehara (1973) observed that when her son, at eight months of age, stretched out his arm to the pull switch of an electric lamp and touched it, he grasped and pulled it and was delighted with seeing the lamp turned on.

From about one to eight months, the infants developed their babbling phonatory-articulatory-auditory mechanisms. At this age level, there was no direct relationship between the development of their phonatory-articulatory-auditory mechanisms and the development of their cognition of the outer world. But, later, based on their cognition of the world they began to use their words as signifiers which represented objects or situations of the world.

Piaget reported the following observation, too. At nine months of age, his son hesitantly lifted a cushion in order to look for a hidden cigar case. But when one end of it appeared, he removed the cushion with one hand and tried to take it out with the other hand. Piaget stated that objects became objectified and became permanent.

At this age level, the infants' mothers became more objectified, more permanent significant persons to the infants.

As we stated, at about twelve months of age the infants began to pick up some of their parents' words and to use them. One of the most important features of these words was that the infants used them in reference to objects or situations which had been differentiated through the infants' daily emotional and sensory-motor experiences. Of course, "Mama" or "Mammy" was one of these words. An American boy, C. C., at fourteen months, began to use "Light" (Nakazima, 1970). He had enjoyed turning on and off the ceiling light manipulating the switch. A Japanese girl, Ya. N., at ten months, began to use "Hat" (Nakazima, 1974). Her mother had taken her out for a walk with a hat on her head. The hat had become a sign of being taken out for her. When she wanted to be taken out, she expressed her wish by gesturing with her whole body and saying "Hat". An American boy, E. D., at eleven months, began to use "Bow wow" (Nakazima, 1973). There was a dog in his house. It had become his intimate friend, one of his family members.

Piaget (1936, 1945) observed her daughter playing a symbolic game at fifteen months of age and showing a deferred imitation at sixteen months. He

stated that a signifier was differentiated from a signified by the middle of the second year.

We would like to say that symbolic function in sensory-motor intelligence is formed by the middle of the second year. We think that the emotional symbolism gives affective meaning to the symbolism in sensory-motor intelligence and the latter makes the former more objectified, and that based on these two kinds of basic roots of symbolism the infants form symbolic function in language development.

### 3. Formation of symbolic function in language development.

As we stated in former articles, at about twelve months of age the infants began to pick up some of their parents' words and to use them. But they did not use them as language. After they began to use words, they uttered, in all sorts of situations, word sounds and meaningless sounds with various articulatory forms for several months. Through these efforts of expression in sounds they began to notice some kind of symbolic relationship between words and the world and to use words in reference to what they wanted to express. During these months the number of words they uttered did not increase. Then, from about the middle of the second year they began to develop their phonemicization-symbolization process, i.e. phonemes and words uttered by them increased in number.

The Japanese girl, Ya.N., at fifteen months of age, played a symbolic game; When her mother ordered her "Go to bed and sleep at once!", she lay down and pretended to sleep in the kitchen. At the same time she began to develop her phonemicization-symbolization process. An American girl, M. O., went through the same process (Nakazima, 1974).

We think that the beginning of their phonemicization-symbolization process means the beginning of the symbolic function in language development. The infants begin to use words as signifiers which represent definite objects or situations. These objects or situations are signifieds. And affective relationship with familiar persons underlies their verbal communication with these persons.

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